

### **REMARKS**

Applicant respectfully requests reconsideration and allowance of claims 1-37, 38-45, 66-94, 95-100, and 121-124 that are pending in the above-identified patent application.

Applicant acknowledges with appreciation that in Part 9 of the Office Action, the Examiner deemed claims 5, 10-27, 30-37, 71-83, and 87-94 as containing patentable subject matter. In view of the remarks below, however, Applicant respectfully requests reconsideration and allowance of the remaining claims.

### **DOUBLE PATENTING REJECTION**

In numbered Parts 2 and 3 of the Office Action, the Examiner has provisionally rejected claims 38-45 and 95-100 under 35 U.S.C. § 101 as claiming the same invention as that of claims 14-24 and 83-89 of co-pending U.S. Patent Application No. 10/158,628. Applicant respectfully traverses the Examiner's rejection.

In determining whether a statutory basis for a double patenting rejection exists, the question to be asked is: Is the same invention being claimed twice? MPEP § 804(II)(A). A reliable test for double patenting under 35 U.S.C. § 101 is whether a claim in the application could be literally infringed without literally infringing a corresponding claim in the patent. *Id.* Is there an embodiment of the invention that falls within the scope of one claim, but not the other? If there is such an embodiment, then identical subject matter is not defined by both claims and statutory double patenting would not exist. *Id.*

Independent claim 38 requires "an amplifier to increase an amplitude of the second intermediate signal to produce a third intermediate signal..." Independent claim 14 of U.S. Patent Application No. 10/158,628 requires "a frequency adjustment circuit operable to change at least one filtering characteristic of the at least one band-pass filter..." Applicant submits that an embodiment of the invention of the instant application can literally infringe claim 38 but not infringe claim 14 of U.S. Patent Application No. 10/158,628. The converse also holds: an embodiment of the invention of U.S. Patent Application No. 10/158,628 can literally infringe claim 14 of that application but not infringe claim 33 of the instant application.

For example, with reference to FIG. 1 of the instant application, and without limiting the scope of the invention, an embodiment of the present invention may include: a band-pass filter 141 that is operable to receive the input signal and produce an intermediate signal on line 142; and an amplifier 144 operable to increase the amplitude of the second intermediate signal on line 142 to produce a third intermediate signal on line 146. A summation circuit 148 may then sum the sub-harmonic signal on line 134 and the third intermediate signal on line 146 to produce at least a portion of an output signal 150. Notably, this embodiment would not infringe claim 14 of U.S. Patent Application No. 10/158,628 because it would not include the “frequency adjustment circuit” that is operable to change at least one filtering characteristic of the band-pass filter 141 as required by that claim.

Further, with reference to FIG. 1 of U.S. Patent Application No. 10/158,628, and without limiting the scope of that invention, one embodiment of that invention may include: a band-pass filter 141 that is operable to receive the input signal and produce a second intermediate signal on line 142; and a frequency adjustment circuit (within the band-pass filter 141) and responsive to the “range adjust” signal on line 141A that is operable to change at least one filtering characteristic of the band-pass filter 141. Notably, this embodiment of U.S. Patent Application No. 10/158,628 would not infringe claim 38 of the instant application inasmuch it does not include “an amplifier operable to increase an amplitude of the second intermediate signal to produce a third intermediate signal...” as required by that claim.

Similar results are obtained when the above-discussed embodiments are evaluated in comparison with claim 95 of the instant application and claim 83 of U.S. Patent Application No. 10/158,628. Indeed, claim 95 includes the step of “producing a third intermediate signal by increasing an amplitude of the second intermediate signal...,” while claim 83 of U.S. Patent Application No. 10/158,628 includes the step of “changing the filtering step to change characteristics of the second intermediate signal...”

The foregoing establishes that there are embodiments of each invention that fall within the literal scope of the respective independent claims, but do not infringe the independent claims of the other application. Accordingly, Applicant submits that there is no basis for statutory double patenting and the Examiner’s provisional rejection of claims 38-45 and 95-100 should be withdrawn.

**§102 REJECTIONS**

In numbered Parts 4-5 of the Office Action, the Examiner rejected 1-3, 6-9, 28, 29, 38-40, 42-45, 66-70, 84-86, 95-100, and 121-124 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,182,930 (“the Blackmer reference”). Applicant respectfully traverses the Examiner’s rejection.

**CLAIMS 1-37, 66-94, 121 AND 123**

Independent apparatus claim 1 requires, among other things, “a wave-shaping circuit operable to receive the square wave signal and produce a second intermediate signal containing sinusoidal signal components from among frequencies corresponding to the respective fundamental frequencies of the square wave signal components;... and a voltage controlled amplifier operable to amplify the second intermediate signal by an amount proportional to the RMS signal to produce a sub-harmonic signal.”

Independent apparatus claim 121 requires “a wave-shaping circuit operable to receive the square wave signal and to produce an intermediate signal containing sinusoidal signal components based on the square wave signal; and a voltage controlled amplifier operable to amplify the intermediate signal by an amount proportional to an instantaneous amplitude of the signal to produce a sub-harmonic signal.”

Independent method claim 66 requires, among other things, “producing a second intermediate signal from the square wave signal such that the second intermediate signal contains sinusoidal signal components from among frequencies corresponding to the respective fundamental frequencies of the square wave signal components;... and amplifying the second intermediate signal by an amount proportional to the RMS signal to produce the sub-harmonic signal.”

Independent method claim 123 requires “producing an intermediate signal that contains sinusoidal signal components based on the square wave signal; [and] amplifying the intermediate signal by an amount proportional to an instantaneous amplitude of the signal to produce the sub-harmonic signal.”

Applicant respectfully submits that the Blackmer reference fails to disclose or suggest the above-quoted features of each of independent claims 1, 66, 121, or 123. At pages 4 and 8 of the Office Action, the Examiner takes the position that the Blackmer reference discloses “a wave-

shaping circuit operable to receive the square wave signal and to produce a second intermediate signal containing sinusoidal signal components from among frequencies corresponding to the respective fundamental frequencies of the square wave signal components (FIG. 6G);... and a voltage controlled amplifier (gain control 24) operable to amplify the second intermediate signal by an amount proportional to the RMS signal [an instantaneous amplitude of the signal] to produce a sub-harmonic signal (output of 24).” Applicant respectfully submits that the Examiner’s analysis is flawed.

With reference to FIG. 4 of the Blackmer reference, the output of a particular band-pass filter 12 is provided to both a zero crossing detector 182 and a double balanced modulator 184. The zero crossing detector 182 produces a square wave signal on line 202, which is divided by a factor of two to produce a signal on line 204. The signal on line 204 is input to the double balanced modulator 184 in order to modify the output of the band-pass filter 12. The output from the double balanced modulator 184 on line 232 is the signal shown in FIG. 6G. Notably, this signal includes all of the frequency content of the output of the band-pass filter 12, although certain half-cycles of the output of the band-pass filter 12 have been inverted in accordance with the square wave signal on line 204.

The square wave signal on line 204 is not subject to wave-shaping as required by independent claims 1 and 121 or is used to produce an intermediate signal that contains sinusoidal signal components based thereon as required by independent method claims 66 and 123 of the instant application. Indeed, while claims 1, 66, 121, and 123 of the instant application contemplate utilizing the square wave signal itself to produce the sub-harmonic signal by shaping that square wave signal and subsequently amplifying the shaped signal in proportion to an instantaneous amplitude of the input signal, the Blackmer reference seeks to preserve the frequency content of the output of the band-pass filter 12 and use the square wave signal on line 204 to modulate by gating and inverting same (see col. 7, lines 4-54; and col. 14, line 47 – col. 15, line 25). The Blackmer reference does not disclose amplifying a square wave signal that has been shaped to contain sinusoidal signal components in an amount proportional to the output of the band-pass filter 12. While the present invention is not limited to the particular embodiment illustrated in FIG. 1, it can be seen that the output of the band-pass filter 102 on line 104 is not provided beyond the zero crossing detector 106. Consequently, the signal on line 116, which is subject to amplification by the VCA 118 contains only the frequency content obtained from the square wave signal on line 112 as modified by the wave-shaping filter 114. In contrast, the Blackmer reference provides the output of

the band-pass filter 12 not only to the zero crossing detector 182, but also to the double balanced modulator 184 such that the frequency content of the output of the band-pass filter 12 gets through to the output on line 232 and, therefore, to the sub-harmonic signal.

In view of the foregoing, Applicant respectfully submits that the Blackmer reference fails to disclose or suggest all of the features of independent claims 1, 66, 121, or 123. Further, the claims dependent on these independent claims contain all of the respective limitations thereof as well as other limitations that are neither disclosed nor suggested by the prior art of record. Accordingly, Applicant submits that claims 1-37, 66-94, 121, and 123 are patentable over the Blackmer reference.

#### **CLAIMS 38-45, 95-100, 122 AND 124**

Independent claim 38 requires “at least one band-pass filter operable to receive the input signal and to produce a second intermediate signal containing frequencies from among a fourth range,...; an amplifier operable to increase an amplitude of the second intermediate signal to produce a third intermediate signal; and a summation circuit operable to sum the sub-harmonic signal and the third intermediate signal to produce at least a portion of an output signal.”

Independent apparatus claim 122 requires “at least one band-pass filter operable to produce an intermediate signal containing frequencies from among a third range of frequencies including at least some frequencies above the second range of frequencies; and a summation circuit operable to sum the sub-harmonic signal and the intermediate signal to produce at least a portion of an output signal.”

Independent method claim 95 requires “producing a second intermediate signal from the input signal such that it contains frequencies from among a fourth range,...; producing a third intermediate signal by increasing an amplitude of the second intermediate signal; and summing the sub-harmonic signal and the third intermediate signal to produce at least a portion of an output signal.”

Independent method claim 124 requires “producing an intermediate signal that contains frequencies from among a third range of frequencies including at least some frequencies above the second range of frequencies; and summing the sub-harmonic signal and the intermediate signal to produce at least a portion of an output signal.”

At pages 6 and 8-9 of the Office Action, the Examiner takes the position that the “band-pass filter” and producing step implicated by the subject claims are met by one of the band-pass filters

12A-N and the “summation circuit” and summing step required by the subject claims are met by one or more of the summing resistors 16A-N that are input to the low pass filter 42. Applicant respectfully submits that the Examiner’s analysis is flawed.

It is important to note that the sub-harmonic signal of the Blackmer reference exists at the input to the low pass filter 42. Thus, the resistors 16A-N cannot possibly sum the output that they combine to produce with another signal. Indeed, there is no feedback of the sub-harmonic signal back into the summing resistors 16A-N. In order for the Examiner to use the Blackmer reference to reject independent claims 38, 95, 122, and 124, he would need to establish that the sub-harmonic signal that is input to the low pass filter 42 is summed with another signal produced from the input signal. As the Blackmer reference is devoid of such teaching, the Examiner is placed in the position of trying to fit a square peg in a round hole.

In view of the foregoing, Applicant submits that the Blackmer reference fails to disclose or suggest the above-quoted features of independent claims 38, 95, 122, and 124. Further, the claims dependent on these independent claims contain the respective limitations thereof as well as other limitations that are neither disclosed nor suggested by the prior art of record. Accordingly, Applicant submits that the subject dependent claims are likewise patentable.

### **§103 REJECTIONS**

In numbered Parts 6-8, the Examiner rejected claims 4 and 41 under 35 U.S.C. § 103(a) as being unpatentable over the Blackmer reference. As discussed above, the Blackmer reference fails to disclose or suggest each of the features of the respective base claims of dependent claims 4 and 41. Consequently, claims 4 and 41 are patentable over the Blackmer reference.

### **CONCLUSION**

In view of the foregoing, Applicant submit that the instant claims are in condition for allowance. Early and favorable action is earnestly solicited.

Applicant therefore respectfully requests reconsideration and allowance in view of the above remarks and amendments. In the event there are any fees due and owing in connection with this matter, please charge same to our Deposit Account No. 11-0223.

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Respectfully submitted,

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